26 August

SPECIAL REPORT
John C.
To: Dr./Lilly

21 May 1963

From: Theodor H. Nelson

ON THE ORGANIZATION AND PROTECTION OF OUR FILM LIBRARY

A film library-- as distinct from just a pile of films-- consists of an ordered array of footage, records of what this footage contains, and a group of methods that will facilitate both its use and preservation.
Generally, in devising such a system, these aspects must be ~~combined in some way, and this~~ integrated and compressed in some way, entails varying degrees of risk and degeneration. Because of the technical variety of possible methods, and the variety of their associated cost functions, there turn out to be no such cut-and-dried systems as exist, (or so it is my impression) skip ~~I believe~~, for libraries of paper. In this brief report I will explain, I hope simply, how many different methods there are, why I think certain methods are probably best for us, and what the final "mix" I proposem for CKI would cost.

This report will concern itself chiefly with methods of duplication, both fixed and mixed, and what they entail for systems of storage. This is because in film work we are uniquely concerned with the safety of the original, and with selecting a group of methods consistent with the purposes we have in mind.

Moreover, The units, ~~and~~ arrays and orders in which we keep them. depend on the ~~xxx~~ natural divisions of the subject matter, and the pictures we make from it. We are and will be producing complete films; what categories we see fit to emphasize in the divisions of the raw footage are a more or less arbitrary matter.

library system.

, such as the types of states these films are to be kept in, depend on these matters.

¶ No reputable editor will edit originals. He may cut them, after the work of editing has been done on a workprint. Similarly, it is only in extraordinary situations that film people will project originals or otherwise tamper with them. Thus the objects of a film library are to keep the originals as safe as they need to be, provide duplicates for such purposes as may present themselves, ~~and~~ catalog make these accessible as needed, and provide a catalog of collateral information such as will make the films useful.

While there are conventional procedures for these purposes, they vary; and ~~these different intents do not lead to the same practices.~~ different purposes do not necessarily ~~have a~~ Furthermore, the costs of these procedures vary; ~~and~~ they all have different implications for the overall price, and for what kinds of film materials deserve the treatment.

no pp

Many of these problems, it must be understood, arise only for documentary materials. (When a fictional screenplay is completed, the "out" shots are commonly thrown away.) Documentary film collections, like ours, however, are quite ~~different~~ special.

The uses to which they may be put are many, and one use should not preclude another. This is the hard part, when Communication Research Institute needs films for so many things.

I estimate the variety of our needs to be unusually large. many.

That is because our uses for films are so ~~many~~ ~~new~~

We want to use our pictures:

~~OUR FILMS~~

(5 spaces)

1. For general edification of the staff, in the organization's background and history. 8 spaces

2. To check on specific happenings in the past, and on circumstances the film might show that our records would not.

3. For scientific analysis.

4. To show to interested parties on the edges of, or outside, the Institute.

5. For our own production of films of general or narrow interest.

6. To supply other users, where justified, with footage for their films or TV use.

7. To act as a repository, for ~~posterity~~, of our unique footage.

8. And ~~For~~ for future uses currently unplanned.

to stand by

II

3

drop 3

Let me enumerate the obligations
to which I believe, we are a party.
I will list them successively, according to the complexity
of the assumptions that must be made ~~for~~ at each step.

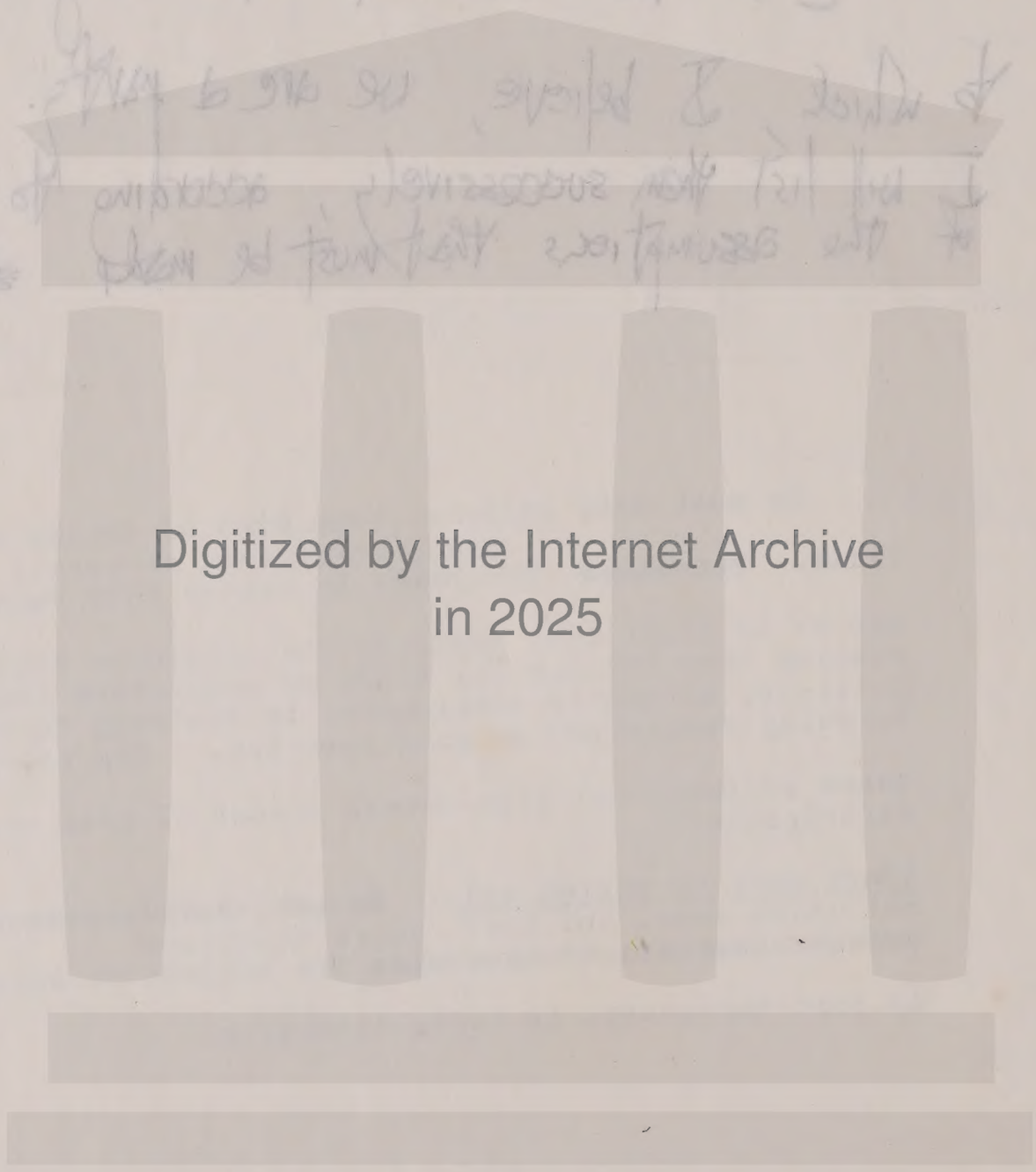
double space
relent 5→

1. We must make copies-- some kind of copies of some of the incontrovertible necessity
films. ~~But which~~ This ~~xxxx~~ is behind this report. There
can be no doubt that handling the originals willy-nilly, and running them through all kinds of projectors (some with built-in, automatic scratchers) is contrary to what is universally recognized as good practice. The thought of it

makes professional film-makers blanch (I have confirmed this empirically.)

There must be copies made. ~~But which films are to be copied~~
But which ones, and how? These questions
~~and how they are to be copied~~ are subject to determinations

in part budgetary, in part~~x~~ strategic.



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2. (except real scraps.) We cannot ~~cut up~~ throw anything out ~~saving~~

We must look beyond the production and hoarding of film to its actual consumption, ~~and~~ realize that for material such as ours, ~~this~~ there cannot be "ultimate consumption." ~~I have said~~ One use of ~~film~~ footage should not preclude another. The trimming-down of materials for one purpose should not necessarily destroy their full length, which may be wanted later. A clear-cut example of this is the superb mating footage with Elvar and Cheechee, which I have managed to preserve in its original form by ad hoc methods, even with the creation of the Mating film.

3.

We must cope with what I shall call the problem of the generations

~~(a still more advanced stage in our thinking.)~~

The problem of the generations is perhaps unique to the film library, deriving jointly from the nature of the copying process and the economics of it.

Unlike copies made, say, of books, films are subject to recursive deterioration as copies are made. (A fourth-generation copy is not nearly so good as a first, etc.) And (at least since unlike audio materials tape recording became current,) the cost of making and storing best copies of films or conjecture of their future importance is really enormous.

The first way we are shagged by the problem of the generations is this: if we make ~~one copy of a~~ one back-up copy of the original, then show the original until it is no good, ~~we throw~~ then repeat this a couple of times, ~~we~~ ~~throw~~ we slip over the generations to worse and worse picture quality.

to this problem of the generations has to do with temptation. It

A special twist is the problem of the ~~deterioration~~ determination that occurs because of the ~~temptations~~

involved in making different films, one at a time, from the same footage.

Naturally, to make your new picture you use the best copy you can. And generally you do not spend the money to make more than one good copy, since its future use is conjectural. That means ~~that the next go-around,~~ for the next film you make needing the same footage, you must cut up your good set; so you make another full copy that is almost as good. And ~~so on.~~ so on the next go-around.

The next best thing to making more than one copy of generation n is to try to persuade the editors of future films to copy entire library sections, ~~to take~~ and edit generation n+1. That way generation n is unharmed, but it ~~that~~ means his final versions of generation (n+3), though, will be instead of generation (n+2). ~~I start.~~

He will be understandably reluctant, ~~I~~

Let us draw a moral from this.

~~Thus,~~ Although we are certainly justified in using the best copies-- ~~xxx~~ in most cases the originals -- for our own purposes, and let hypothetical future purposes shift for themselves, still it seems to me that we ~~x~~ are obligated to leave behind, if feasible, the next best set of copies of this particular material in the best-filed condition.

To put it graphically:

drop 5 adj on a page

margin

MINIMUM PROTECTIVE SYSTEM FOR MATERIALS V FILMS ARE MADE OF. THAT FINISHED

Generation ~~1~~ I

Full-length originals

Generation ~~1~~ 2

Cut original

Full-length dupe$_1$ *

Generation ~~2~~ 3

Cut dupe$_1$

Full-length dupe$_2$

drop 5

These are the temptations of this system.

don't indent

successively marking

Of course, it might be argued that these full-length copies ~~are~~ is unnecessary: ~~at successive stages~~.

~~It might be~~ proposed ~~that~~ that these shots as they appear in the finished films will be adequate for posterity, since their quality in these stages will be good, and desired things can always be lifted from finished work.

But I believe that this is wrong

on two points. First, in the finished films they will have been snipped short for effect, for timing and emphasis within the context of a particular scene, greatly curtailing their value to the next user. Second, once spliced into our main films, they have lost their identity as far as the files are concerned, and the collateral information of a scene-- items like the date, namesof the people and animals, the circumstances and ~~xxxxxxxxxx~~ erudite points of scientific significance, ~~xxxxx~~ will have been lost thereby. (but pivotal)

Trying to make exceptions for full-length sequences would be a bookkeeping disaster.

general Now, with our needs so stated, ~~now~~ can we find a

~~system~~ for handling film, such as to avoid the confusions,

scrabblings and interminable requisitioning headaches

that have come up so far? ~~and~~ Let me ~~ex~~ examine ~~xxx~~

a number of possible "systems," ~~xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx~~

dividing them into two classifications as we go: the

monolithic system and the polylithic system.

(see Appendix)

On a separate sheet/I have provided a graphic key to the different chains of film reproduction that are possible, all beginning with 16mm ~~xxx~~ color. The associated prices and "quality factors" are approximate. Note that this chart ~~xxx~~ takes no account of intermediate stages that are used as a guide to later work, ~~xxxxxxxxxx~~ i.e., workprints.

Systems A to G on the list give different reproductive sequences, with different costs and advantages. If we are going to

~~Nor does it discuss the systems~~ Plan N method, use all one ~~system~~

it's "monolithic;" if ~~you~~ we do different things to different things, they

it's "polylithic."

Below we will discuss the different qualities that depend on systems mix, and the

~~The~~ comparative advantages of ~~xxxxxxxx~~

mono- and polylithic systems ~~will be discussed below.~~

MONOLITHIC SYSTEMS

The monolithic system has a number of natural advantages.

There are certain real advantages to be gained from selecting only one method of duplicating, indexing and storage, and holding to it inflexibly. This in general simplifies procedure and bookkeeping. Traffic management, in having copies made, is greatly simplified. After duplication, all materials can be arrayed in a unified fashion, stored according to some simple rule, and always handled and processed in just the same sequence.

Moreover, if you handle all footage alike until the editing stages, with similar preservation copies (and whatever other copies are involved,) you then have several parallel sets of the same material, which is a great convenience when it comes to editing, replacing sections, etc.

MONTCLAIR STATE COLLEGE

Now, many ~~systems~~ monolithic systems might be possible, each being convenient or safe in some different way or degree. Few of them are necessarily sensible or effective.

There are, in fact, only two monolithic systems which may reasonably be considered here. One, the "protection copy" system, is unsatisfactory because it will not protect the films, and is expensive, while highly satisfactory in all respects, and the other system, Internegative, is ~~very~~ expensive.

There are, in fact, only

'PROTECTION COPIES' system

The protection-copy system uses the originals for both viewing and making copies. A set of protection copies are stored for emergencies, or in case of special damage to the original.

While this would be better than what we are now doing, I do not think it would be the best system on several counts. First, a protection copy under ordinary conditions is just that: a copy kept in another place, not used for anything. Meantime the original is going through the wringer. The wear and tear of viewing and handling do not leave the original in good enough condition for making further copies. However, this damage is usually subliminal. It is not likely to be bad enough to make us go to the storage copies, and anyway, these aren't going to be any better, being only copies anyway. Thus the problem of the generations with the protection copy system is something fierce. When the original is all torn up we must make copies of copies, and then show them.

When the first copies wear out we must make third copies and show second copies, etc.

And the original picture quality is gone with the wind.

¶ This is not so farfetched as it may sound. One good long scratch, administered by a malignant projector, runaway rewinds, or whatnot, can be the end of showability. Several of our films have this severe damage, and in one case we do have a copy that is better than the damaged original. This will all get worse if things go on as they are.

UFPA

COMPLETE INTERNEGATIVES AND PRINTS

Another monolithic system-- the good one-- is that used by anyone who has the funds and cares about his footage. (For instance, as I mentioned in my first AUFS report, this is the system used by the Birdwhistell project at EPPI.)

The system is to make vault negative masters of the whole library on color internegative, never cut these or the originals, and (when producing pictures from the material) maintain a complete set of positive prints for viewing, cut only third-generation workprints and masters. (At EPPI, only fourth-generation prints are ever projected.) prepared in addition to the other sets.

No 9 From the point of view of "good practice," this is the long-run only acceptable system. If we can ever afford it this is what we should do.

(Note that internegative systems D-G ~~(illegible)~~ — see Appendix — permit use of the internegative as a ~~(illegible)~~ safety master.)

One of the principal points I wanted to get across is that while color internegative is much more expensive, it is also much better, particularly if ~~several~~ further generations of prints are likely to follow after.

Since procedures aimed at ~~(illegible)~~ production release go several ~~stage~~ generations beyond the internegative, it is feasible with internegative to ~~(illegible)~~ at a later stage, and thus stop decay altogether, commencing regenerative image deviation to stop.

~~How Internag. solves. ppl. of gen's.~~

It is claimed that after two generations-- positive to negative and back again-- the results are as good as an ordinary first-generation color print. This is the reason for its high cost.

~~It is satisfactory to from the internegative the next stage is to~~

For quality release, ~~is to~~ take a master positive and ~~then a new negative.~~ then a final production negatives.

~~(Supposedly good enough~~

~~(Supposedly this step yields satisfactory results.)~~

no ~~If~~ Thus it is quite proper to do the final cut at generation 3, leaving generations 1 and 2 safe.

In other words, Internegative holds an extra advantage in its temptation structure .

~~MONO INTERNEG.~~ To use a monolithic several-generation system (i.e., Internegative)

¶ Should God's grace permit us ∧

~~(i.e., Internegative we~~ we should strongly consider double-printing ~~the Interneg~~ onto the Internegative roll from ~~this will~~ a second roll of frame-numbers. This is the procedure employed ~~at the EPPI, at the Brighton Tech~~ at EPPI, as I have already mentioned. ~~It is a report.~~

We could do it ~~This would be done~~ either by their ~~the EPPI~~ method ~~if possible~~ in the picture area, top of the ~~frame~~ frame; at an aesthetic sacrifice, ~~either~~ or possibly on the edge.

¶ This would yield, for the first time, exact timings of everything ~~while~~ we were rolling, and a definitive chronology among shots, even in edited prints. (As an example of ~~this~~ the need for this, Bateson deplored the fact that there was no way of telling in the mating film ~~which~~ pre-edited before it fell into my hands, and received its current edgenumbering what happened when.) Moreover, it looks very scientific.

Unfortunately, it costs some 20¢ a foot for the internegative and 15¢ for the first print. Thus the cost of this sytem would be 35¢ a foot for every foot we keep, not counting the cost of the original footage or of extra materials to edit.

Whether this is worth it or not is a hard matter to consider. If the money exists, alternative uses are most tempting. Is it worth it to spend thirty-five or fifty cents a foot on material shot in haste or uncertainty? Considering that the cost of the original is roughly a dime a foot, this is quite a bit.

On the other hand, there are characteristics of our footage that give it great value once it is shot. The events are non-repeatable, and the undertaking is historic.

However,

~~Moreover,~~ the diversity of our film materials is an argument against treating the films all alike. ~~In this regard.~~ Of course, if the systems were cheaper, or if the trivial footage were small or predictable, or if what we would eventually need were surely predictable so that we could throw everything else away right off the bat, then it would be worthwwhile to handle all footage alike for the sake off completeness.

But it should be obvious that when the costs of different systems differ a lot, the utilities (goodness to us) of different parts vary enormously, and it may be better to do somex things very cheaply and others very expensively. If we duplicate some films cheaply and some expensively, or xx xnd others not at all, this ~~would be a~~ is the "polylithic" system.

POLYLITHIC SYSTEMS

Thus it seems likely that some sort of "polylithic" system is in order-- where the method of storage depends in part upon the quality and possible uses of the footage. Such a prospect would cause many librarians to blanch-- like the prospect of a library composed of not just books and magazines, but offset plates, mimeo stencils and handwritten notes as well.

There are any number of polylithic systems possible. The only ones that it makes any sense to consider, of course, are those having a basis for discriminating among the films, presumably some rationale of quality, urgency, etc., and making up for their heterogeneity by an integrated procedure.

There is no reason to conjure up any of these for description here. I would rather jump right in with a polylithic system which makes sense. Rather than merely say, "treat the films differently according to quality," I will state the ways they should be treated, the ways they should be stored, and how they should be removed and returned when copies are needed.

If we attempted to compress the different polylithic systems into a linear hierarchy, ranging from best practice to meanest and "most monolithic" to randomly varied method mixes, I would assert that the point in this linear hierarchy represented by my setup is both a good compromise economically, and superior to all points in its neighborhood. This corresponds to system 5 in the appendix, better if properly done than either 4 or 6.

PROPOSAL OF A GENERAL SETUP

Let me propose a library system of units, states and methods that will, in my opinion, be a good compromise. This library system has several desirable features:

It is relatively inexpensive.

The originals are relatively safe.

The total footage is available in uncut form.

All footage is viewable in some form.

Best copies, uncut, may be pulled from the masters at any time.

Certain features that might be wanted will have to be foregone, but that is the nature of decision.

The actual proposal, then, is this: that one complete set of films, the "Master Set," be put in remote but accessible storage. All of these are to be incolor, possibly a few in black and white; some positive, some negative; but the Master Set is to be complete. In general these are to be originals or internegative.

W

Dividing the major segments of these films, xx and always at the beginning and end, are xxxxx to be title-numbers on the leader sections with the leader.

These title-numbers key into a master written index, of which separate copies are kept.

A matching complete set of the films, which I will call the "Access Set," ~~uncut and~~ containing no negatives, and uncut ~~except~~ (but spliced at points where the type of print changes,) is to be kept for viewing, with all the title-numbers intact. This set is not to leave the premises, certain (Under circumstances it should go into special couvade if the Masters is away being printed.)

~~No~~ Release films are ~~to be kept~~ separate from these. (The release prints may range from one or two ~~or three~~ copies of a job with an electroprinted sound track to the national release ~~expected~~ possible for Man and Dolphin. ~~with Storage~~.)

~~No~~ For special purposes-- like showing to visitors or lending to TV stations-- other subsets of the film can be specially copied, excerpted and spliced, removing title-numbers.

For the actual process of making our own release films, originals or best possible copies would be used as masters, but best copies would be made of the uncut originals, so as not to preclude other editings of the same film in the future. By careful husbandry on this point we can be sure that after making a release film at generation n we can always make another, different release film at generation n + 1.

(one of having the same footage full length and

These films, both Master and Access copies, should probably be in the same order; the particular order should wait to be settled upon until they have all been catalogued. While chronological order may be easiest, it might be preferable later to re-order them by laboratory, by animal, by topic, or by degree of interest.

The exact method of spooling these films will have to be somewhere between that method affording greatest convenience, and that affording greatest security. For greatest convenience, the library would be broken up into very small sequences wound separately onto cores, from ten-odd feet to some two hundred in length. However, this method is very insecure. The insecurity stems from the ease with which these cores can be misplaced, especially since their unequal winding leads to their being stored out of order. The most secure method would be to wind the originals on reels of 1200 feet or more capacity. This has the disadvantage, however, of considerably increasing access time for any desired footage. Moreover, it makes the storage units even less likely to correspond to any meaningful subdivisions.

Naturally, the way in which the films are stored places no restrictions on which ones can be duplicated separately in the future. The plan is to intersplice leader at all reasonable sequence divisions, and take excerpts from among the masters by cutting only this leader. (See Appendix.)

MONEY NEEDS, for each type of treatment

In report

All this ~~preamble~~ has been to explain ~~mmm mmmmm~~ that there are no cut-and-dried methods for ~~mmmmmm~~ making our films both safe and usable, ~~and~~ to explain that the cost of such a system is not just a simply determinate function of the quantity of footage that we have, ~~and~~ ~~to give some insight into why I have proposed systems~~ to propose and explain a library system that cannot be explained in one or two sentences, and ~~m~~ to make the following recommendations ~~m mmmmm~~ comprehensible. (These recommendations apply to a film library only, and have no bearing on ~~the workprints~~ workprints we ~~make of other~~ or other-phase prints ~~I think we should~~ needed for the ~~release~~ films we are working on.)

I think that we should have duplicates made of our films~~mmmmm~~ according to the ~~m~~ following schedule:

				Unit Cost (foot)	Total cost (approx.)
(Vault copy)	Master ~~copy~~ dupe	Access copy	Footage		
Original	Internegative	Color positive	~~2000~~ 2000.	.30	600.
~~(Original)~~	Good color print		2000	.12	240.
~~(Original)~~	~~Cheap color print~~ Black-and white reversal print		2000	~~.05~~ .06	~~100.~~ 120.
				~~.072~~	144.

DeLuxe laboratories in New York makes prints on spliced stock for .06 a foot.

8

Remarks

14

This is our best.
All of it will go into the originals
Man and Dolphin, but only
after a lot of snipping. Making
full-length masters of the full-length scenes
will permit subsequent re-use of their full lengths,
at a ~~great~~ high quality.

30

For redundancies, inferior items, 82
records of repairs, etc.

light color

(Appendix sheet)

DIFFERENT ~~POLICIES~~ SYSTEMS of caring for films.

(As opposed to 'methods' of duplicating; for which see appendix.)

1. Originals intact, internegatives, with blown-up 35mm/color internegatives of all footage,

35mm black-and-white separation masters for posterity,

etc. to whatever degree anyone might possibly desire.

2. (Same as below; interject at 'Z': complete, remote, sealed set of safety masters;

3 ~~2.~~ Originals intact; 16mm color internegative and

viewing copies of all footage; only third-generation masters edited or fourth-generation projected, with workprints and so on as needed.

4 ~~3.~~ Originals all safe; viewing copies, (as well as workprints, etc., made positive)

for all footage.

5 ~~4.~~ Originals mainly safe; some waste footage trimmed from them; copies made of good footage for showing and editing.

(internegs. & protects. variously)

6 ~~5.~~ Originals shown, but "protection" prints put away.

7 ~~6.~~ Originals hacked up and shown promiscuously.

T.H. Nelson
Communication Research Institute
Special Report

ON THE ORGANIZATION AND PROTECTION OF OUR FILM LIBRARY

Nature of a Film Library 1
Variety of Our Needs 3
Consequent Obligations 3
MONOLITHIC SYSTEMS 8
'PROTECTION COPIES' system 9
COMPLETE INTERNEGATIVES AND PRINTS 10
POLYLITHIC SYSTEMS 13
PROPOSAL OF A GENERAL SETUP 14
MONEY NEEDS, for each type of treatment 17
APPENDIX
Varieties of Duplication Systems 19
Different Systems of Caring for Film 20
DESIGN FOR A FILM LIBRARY 21
METHOD OF STORING MASTERS AND MAKING SUB-DUPLICATES 22

SPECIAL REPORT 26 August 1963

To: Dr. John C. Lilly From: Theodor H. Nelson

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A film library-- as distinct from just a pile of films-- consists of an ordered array of footage, records of what this footage contains, and a group of methods that will facilitate both its use and preservation. Generally, in devising such a system, these aspects must be integrated and compressed in some way, entailing varying degrees of risk and degeneration. Because of the technical variety of possible methods, and the variety of their associated cost functions, there turn out to be no such cut-and-dried systems as exist for libraries of paper. In this brief report I will explain, I hope simply, how many different methods there are, why I think certain methods are probably best for us, and what the final "mix" I propose for CRI would cost.

This report will concern itself chiefly with methods of duplication, both fixed and mixed, and what they entail for systems of storage. This is because in film work we are uniquely concerned with the safety of the original,

and with selecting a group of methods consistent with the other purposes we have in mind. Moreover, the units, arrays and orders in which we keep them depend on the natural divisions of the subject matter, and the pictures we make from it. We are and will be producing complete films; what categories we see fit to emphasize in the divisions of the raw footage are a more or less arbitrary matter. Copying, with the handling sequences that attend it, is the keystone of a film library system. The other questions, such as the types of stores the films are to be kept in, depend on these matters.

No reputable editor will edit originals. He may cut them, after the work of editing has been done on a work-print. Similarly, it is only in extraordinary situations that film people will project originals or otherwise temper with them. Thus the objects of a film library are to keep the originals as safe as they need to be, provide duplicates for such purposes as may present themselves, make these accessible as needed, and provide a catalog of collateral information such as will make the films useful.

While there are conventional procedures for these purposes, they vary; and different purposes do not necessarily lead to the same practices. Furthermore, the costs of these procedures vary; they all have different implications for the overall price, and for what kinds of film materials deserve the treatment. Many of these problems, it must be understood, arise only for documentary materials. (When a

fictional screenplay is completed, the "out" shots are commonly thrown away. Documentary film collections like ours, however, are quite special. The uses to which they may be put are many, and one use should not preclude another. This is the hard part, when Communication Research Institute needs films for so many things.

I estimate the variety of our needs to be unusually large. That is because our uses for films are so many. We want to use our pictures:

1. For general edification of the staff, in the organization's background and history.

2. To check on specific happenings in the past, and on circumstances the film might show that our records would not.

3. For scientific analysis.

4. To show to interested parties on the edges of, or outside, the Institute.

5. For our own production of films of general or narrow interest.

6. To supply other users, where justified, with footage for their films or TV use.

7. To act as a repository, for posterity, of our unique footage.

8. And to stand by for future uses currently unplanned.

Let me enumerate the consequent obligations to which, I believe, we are a party. I will list them successively, according to the complexity of the assumptions that must be made at each step.

1. We must make copies-- some kind of copies of some of the films. This incontrovertible necessity is behind

this report. There can be no doubt that handling the originals willy-nilly, and running them through all kinds of projectors (some with built-in, automatic scratchers) is contrary to what is universally recognized as good practice. The thought of it makes professional film-makers blanch (I have confirmed this empirically.) There must be copies made. But which ones, and how? These questions are subject to determinations in part budgetary, in part strategic.

2. We cannot throw anything out (except real scraps.) We must look beyond the production and hoarding of film to its actual consumption, and realize that for materials such as ours, there cannot be "ultimate consumption." One use of footage should not preclude another. The trimming-down of materials for one purpose should not necessarily destroy their full length, which may be wanted later. A clear-cut example of this is the superb mating footage with Elvar and Cheechee, which I have managed to preserve in its original form by ad hoc methods, even with the creation of the Mating film.

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Unlike copies made, say, of books, films are subject to recursive deterioration as copies are made. (A fourth-

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The first way we are snagged by the problem of the x generations is this: if we make one back-up copy of the x original, then show the original until it is no good, we slip (over the generations) to worse and worse picture quality. A special twist to this problem of the generations has to do with temptation. It is the problem of the deterioration that occurs because of the temptations involved in making different films, one at a time, from the same footage.

Naturally, to make your new picture you use the best copy you can. And generally you do not spend the money to make more than one good copy, since its future use is conjectural. That means for the next film you make needing the same footage, you must cut up your good set; so you make another full copy that is <u>almost</u> as good. And so on the next go-round.

The next best thing to making more than one copy of generation <u>n</u> is to try to persuade the editorm of a future film to copy entire library sections and edit generation (<u>n</u> + 1.) That way generation <u>n</u> is unharmed, but it means <u>his</u> final versions will be of generation (<u>n</u> + 3), though, in-

stead of generation (n + 2). He will be understandably reluctant. Let us draw a moral from this. Although we are certainly justified in using the best copies-- in most cases the originals-- for our own purposes, and letting hypothetical future porposes shift for themselves, still it seems to me that we are obligated to leave behind, if feasible, the next best set of copies of this particular material in the best-filed condition. To put it graphically:

MINIMUM PROTECTIVE SYSTEM FOR MATERIALS THAT FINISHED FILMS ARE MADE OF.

Generation 1	Generation 2	Generation 3
Full-length originals	Cut original	Cut dupe$_1$
	Full-length dupe$_1$	Full-length dupe$_2$

Those are the temptations of this systems

Of course, it might be argued that successively making these full-length copies is unnecessary: that these shots as they appear in the finished films will be adequate for posterity, since their quality in these stages will be good, and desired things can always be lifted from masters of the finished work. But I believe this is wrong on two points. First, in the finished films they will have been snipped short for effect: for timing and emphasis within the context of a particular scene, greatly curtailing their value to the next user. Second, once spliced into our main films, they have lost their identity as far as the files are concerned, and the collateral information of its scene--

items like the date, names of the people and animals, the circumstances and erudite but pivotal points of scientific significance will have been lost thereby. Trying to make exceptions for full-length sequences would be a bookkeeping disaster.

Now, with our needs so stated, can we find a general system for handling film, such as to avoid the confusions, scrabblings and interminable requisitioning headaches that have come up so far in duplicating films at CRI? Let me examine a number of possible "systems," dividing them into two classifications as we go: the monolithic system and the polylithic system.

On a separate sheet (see Appendix) I have provided a graphic key to the different chains of film reproduction that are possible, all beginning with 16mm color. The associated prices and "quality factors" are approximate. Note that this chart takes no account of intermediate stages that are used as a guide to later work, i.e., work-prints. Systems A to G on the list are different reproductive sequences, with different costs and advantages. If we are going to use all one method, it's "monolithic;" if we do different things <u>to</u> different things, it's "polylithic." Below we will discuss the different qualities that depend on systems mix, and the comparative advantages of mono- and polylithic systems.

MONOLITHIC SYSTEMS

The monolithic system has a number of natural advantages. There are certain real advantages to be gained from selecting only one method of duplicating, indexing and storage, and holding to it inflexibly. This in general simplifies procedure and bookkeping. Traffic management, in having copies made, is greatly simplified. After duplication, all materials can be arrayed in a unified fashion, stored according to some simple rule, and always handled and processed in just the same sequence. Moreover, if you handle all footage alike until the editing stages, with similar preservation copies (and whatever other copies are involved,) you then have several parallel sets of the same material, which is a great convenience when it comes to editing, replacing sections, etc.

Now , many monolithic systems might be possible, each being convenient or safe in some different way or degree. Few of them are necessarily sensible or effective. There are, in fact, only two monolithic systems which may reasonably be considered here. One, the "protection copy" system, is unsatisfactory because it will not protect the films, and is expensive, and the other system, Internegative, while highly satisfactory in all respects, is expensive.

'PROTECTION COPIES' system

The protection-copy system uses the originals for both viewing and making copies. A set of "protection" copies are stored for emergencies, or in case of special damage to the original.

While this would be better than what we are now doing, I do not think it would be the best system on several counts. First, a protection copy under ordinary conditions is just that: a copy kept in another place, not used for anything. Meantime the original is going through the wringer. The wear and tear of viewing and handling do not leave the original in good enough condition for making further copies. However, this damage is usually subliminal. It is not likely to be bad enough to make us go to the storage copies, and, anyway, these aren't going to be any better, being only copies anyway. Thus the problem of the generations with the protection-copy system is something fierce. When the original is all torn up we must make copies of copies, and then show them. When the first copies wear out we must make third copies and show second copies, etc. And the original picture quality is gone with the wind.

This is not so farfetched as it may sound. One good long scratch, administered by a malignant projector, runaway rewinds, misthreading in a viewer, or whatnot, can be the end of showability. Several of our films have this severe damage, and in one case we do have a copy that is better than its damaged original. This will get worse if things

go on as they are.

COMPLETE INTERNEGATIVES AND PRINTS

Another monolithic system-- the good one-- is that used by anyone who has the funds and cares about his footage. (For instance, as I mentioned in my first UFPA report, this is the system used by the Birdwhistell project at EPPI.) The system is to make vault negative masters of the whole library on color internegative, never cut these or the originals, maintain a complete set of positive prints for viewing, and (when producing pictures from the material,) cut only third-generation workprints and masters prepared in addition to the other sets. (At EPPI, only fourth-generation prints are ever projected.) From the point of view of "good practice," this is the only system acceptable in the long run. If we can ever afford it, this is what we should do. (Note that internegative systems D-G-- see Appendix-- permit use of the internegative as a safety master.)

One of the principal points I wanted to get across is that while color internegative is much more expensive, it is also much better, particularly if further generations of prints are likely to follow after. Since procedures aimed at production release go several generations beyond the internegative, it is feasible with internegative to edit at a later stage, and thus stop image decay altogether, commanding degenerative devolution to stop.

(It is claimed that after two generations-- positive to negative and back again-- the results are as good as an ordinary first-generation color print. This is the reason for its high cost. For quantity release, it is satisfactory to take a master positive and then final production negatives. Thus it is quite proper to do the final cut at generation 3, leaving generations 1 and 2 safe. In other words, Internegative holds an extra advantage in its temptation structure.

Should God's grace permit us to use a monolithic several-generation system (i.e., Internegative,) we should strongly consider double-printing onto the Internegative roll from a second roll of frame-numbers. This is the procedure employed at EPPI, as I have mentioned to you. We could do it either by their method-- in the picture area, top of the frame; at an aesthetic sacrifice-- or possibly on the edge.

This would yield fairly exact timings of everything while the camera runs, and a definitive chronology among shots, even in edited prints. (As an example of the need for this, Bateson deplored the fact that there was no way of telling in the mating film-- pre-edited before it fell into my hands and received its current edgenumbering-- what happened when.) Moreover, it looks very scientific.

Unfortunately, there is a cost of some 20¢ a foot for the internegative and 15¢ for the first print

(slightly more if we overprint numbers.) Thus the cost of this system would be 35¢ a foot for every foot we keep, not counting the cost of the original footage or of extra materials to edit.

Whether this is worth it or not is a hard matter to consider. If the money exists, alternative uses are most tempting. Is it worth it to spend thirty-five or fifty cents a foot on material shot in haste or uncertainty? Considering that the cost of the original is roughly a dime a foot, this is quite a bit.

On the other hand, there are characteristics of our footage that give it great value once it is shot. The events are non-repeatable, and the undertaking is historic.

However, the diversity of our film materials is an argument against treating the films all alike. Of course, if the systems were cheaper, or if the trivial footage were small or predictable, or if what we would eventually need were surely predictable so that we could throw everything else away right off the bat, then it would be worthwhile to handle all footage alike for the sake of completeness. But it should be obvious that when the costs of different systems differ a lot, the utilities (goodness to us) of different parts vary enormously, and it may be better to do some things very cheaply and others very expensively. If we duplicate some films cheaply and some expensively, this is a "polylithic" system.

POLYLITHIC SYSTEMS

Thus it seems likely that some sort of "polylithic" system is in order-- where the method of storage depends in part upon the quality and possible uses of the footage. Such a prospect would cause many librarians to xxxxxx xxxxxxxx blanch-- like x the prospect of a library composed of not just books and magazines, but offset plates, mimeo stencils xxxxxxxx and handwritten notes as well. There are any number of polylithic systems possible. The only ones that it makes any sense to consider, of course, are those having a basis for discriminating among the films, presumably some rationale of quality, urgency, etc., and making up for their heterogeneity by an integrated procedure.

There is no reason to conjure up any of these for description here. I would rather jump right in with a polylithic system which makes sense. Rather than merely say, "treat the films differently according to quality," I will state the ways they should be treated, the ways they should be stored, and how they should be removed and returned when copies are needed. (If we attempted to compress the different polylithic systems into a linear hierarchy, ranging from best practice to meanest and from randomly varied method mixes to "most monolithic," I would assert that the point in this linear hierarchy represented by my setup is both a good compromise economically, and superior to all points in its neighborhood. This is xxx system 5 in the Appendix, better-- if properly done-- than either 4 or 6.)

PROPOSAL OF A GENERAL SETUP

Let me propose a library system of units, states and methods that will, in my ~~x~~ opinion, be a good compromise. This library system has several desirable features:

It is relatively inexpensive.
(Compared to all-Internegative.)

The originals are relatively safe.

The total footage is available in uncut form.

All footage is viewable in some form.

Best copies, uncut, may be pulled from the masters at any time.

Certain features that might be wanted will have to be foregone, but that is the nature of~~x~~decision.

The actual proposal, then, is this: that one complete set of films, the "Master Set," be put in remote but accessible storage. All of these are to be in color; some [illegible] positive, some negative; but the Master Set is to be complete. In general these are to be originals or Internegative. Dividing the major segments of these films, and always at the beginning and end, are leader sections with title-numbers.

A matching complete set of the films, which I will call the "Access Set," containing no negatives and uncut (but spliced at points where the type of print changes,) is to be kept for viewing, with all the title-numbers intact. This set

is not to leave the premises. (Under certain circumstances it should go into special couvade if the Master is away being printed.) Release films are to be kept separate from these. (The release prints may range from one or two copies of a job with an electroprinted sound track to the national release possible for Man and Dolphin.) Masters of release films should be stored at a reputable laboratory, with one perfect copy kept sealed by us. For special purposes-- like showing to visitors or lending to TV stations-- other subsets of the film can be specially copied, excerpted and spliced, removing title-numbers.

For the actual process of making our own release films, originals or best possible copies would be used as masters, but best copies would be made of the uncut originals, so as not to preclude other editings of the same film in the future. By careful husbandry we can thus be sure that after making a release film at generation n we can always make sure of having the same footage full length to go into another,different release film at generation n - 1.

These films, both Master and Access copies, should probably be in the same order; the particular order should wait to be settled upon until the films have all been catalogued. While chronological order may be easiest, it might be preferable later to re-order them by laboratory, by animal, by topic, or by degree of interest.

The exact method of spooling these films will have to be somewhere between that method affording greatest conven-

ience, and that affording greatest security. For greatest convenience, the library would be broken up into very small sequences wound separately onto cores, from ten-odd feet to some two hundred in length. However, this method is very insecure. The insecurity stems from the ease with which these cores can be misplaced, especially since their unequal winding leads to their being stored out of order. The most secure method would be to wind the originals on reels of 1200 feet or more capacity. This has the disadvantage, however, of considerably increasing access time for any desired footage. Moreover, it makes the storage units even less likely to correspond to any meaningful subdivisions.

Naturally, the way in which the films are arrayed places no restrictions on which ones can be duplicated separately in the future. The plan is to intersplice leader at all reasonable sequence divisions, and take excerpts from among the masters by cutting only this leader.

Most importantly, of course, a complete catalog must be made, keyed to the title-numbers. Such a catalog would list the length of individual film sequences and, where possible, the date made, the names of people and animals appearing, and the action occurring. Since a catalog is not restricted as to information/(the passband way the sequencing of the film is,) it might also include the importance of the sequence, the name of the photographer, the purpose for which it was taken (if not self-evident from the description,) and other points of interest, where

significant. The catalog must also include such collateral technical information as copying history, the location of prints, the uses to which footage from a given section has already been put, edgenumbers that exist on copies, the form of the master and so on. (In practice this information would not, for any given piece of film, be bothersomely large.)

Copies of the catalog will be kept with the Master films, with the Access films, in the Institute library, and elsewhere that it might be needed. Because the library is still small, such a list would probably not need cross-indexing until after several years of growth.

MONEY NEEDS, for each type of treatment

All this report has been to explain that there are no cut-and-dried methods for making our films both safe and usable, to explain that the cost of such a system is not just a simply determinate function of the quantity of footage that we have, to propose and explain a library system that cannot be explained in one or two sentences, and to make the following recommendations comprehensible. (These recommendations apply to a film library only, and have no bearing on the workprints or other-phase prints needed for the films we are working on.)

I think that we should have duplicates made of our films according to the following schedule:

Master Copy	Access Copy	Footage (approx)	Unit Cost (foot)	Total Cost (approx.)	Remarks
Internegative (Orig. in Vault)	Color Positive	2000	.35	700.	This is our best. All the originals belong in Man and Dolphin, but only after a lot of snipping. Making masters of the full-length scenes before conforming original to workprint will permit subsequent high-quality full-length re-use.
Original	Good color print	2000	.12	240.	
Original	Cheap color print (price quoted is DeLuxe Labs' for one-light color prints on spliced stock.)	2000	.06	120.	For redundancies, inferior items, records of repairs, etc.
				$1,060.00	

APPENDIX

The varieties of duplication systems.

NOTE THAT EACH PRINTING OPERATION HAS TWO NUMBERS ASSOCIATED WITH IT. THESE ARE:

QUALITY FACTOR →
PRICE PER FOOT

NOTE: A) QUALITY FACTOR IS MY OWN ROUGH ESTIMATE OF HOW GOOD THE RESULT IS; AS A MODEL IT CAN BE TREATED MULTIPLICATIVELY.*
B) THE RATIO OF QUALITY & PRICE HAS NO INTERPRETATION IN THIS MODEL.
C) 'X' PRICES ARE NOT OUR PROBLEM.

System	1st Generation	2d Generation	3d Generation	4th Generation	5th Generation
A	Orig. —.95/.072→	BW Reversal print			
B	Orig. —.7/.05→	Cheap color reversal print			
C	Orig. —.85/.087 to .122→	Good color reversal print			
D	Orig. —.99/.20→	Color Internegative —.95/.05→	BW Neg. print		
E	Orig. —.94/.20→	Color Internegative —.99/.15→	Color print		
F	Orig. —.99/.20→	Color Internegative —.96**/X→	Color Duke Negative —.94**/X→	Release Print	
G	Orig. —.99/.20→	Color Internegative —.94**/X→	Color Interpositive —.94**/X→	Internegative —.94**/X→	Release Print

For simplicity's sake prices given are mostly from one lab. Most services are available for 1½ - 2¢ less.

* Price is additive.
** Should be better in 35mm, if size is enlarged on second operation.

TN. 6 May 1963

TN. 6 May 1963

DIFFERENT SYSTEMS of caring for films.

(Polylithic combinations of the systems on page 19, or more expensive ones.)

1. Originals intact, with blown-up 35mm color internegatives of all footage, 35mm black-and-white separation masters for posterity, etc. to whatever degree of completeness and perfection anybody might desire.

2. Originals intact; complete, remote, sealed set of safety masters; 16mm color internegative and viewing copies of all footage; only third-generation masters edited or fxxx fourth-generation projected, with workprints and so on as needed.

3. Originals intact; 16mm color internegative and viewing copies of all footage; only third-generation masters edited or third-generation copies projected.

4. Originals all safe; positive viewing copies (as well as workprints, etc.,) made for all footage.

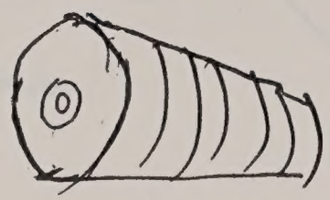
5. Originals mainly safe; some waste footage trimmed from them; internegative and protection copies variously made of good footage for showing and editing.

6. Originals shown, but "protection" prints put away.

7. Originals hacked up and shown promiscuously.

DESIGN FOR A FILM LIBRARY.

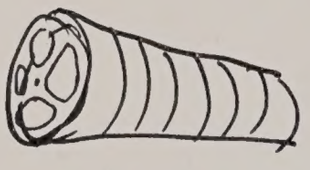
1. Masters.



TO BE LEFT ALONE, EXCEPT WHEN DUPLICATES ARE NEEDED.

THEY ARE TO BE STORED IN DIFFERENT FORMS — SOME ORIGINAL, SOME NEGATIVE — AS REQUIRED.

2. Viewing copies.



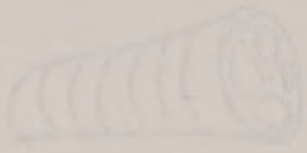
IN SAME ORDER, & WITH SAME LABELS, AS MASTER COPIES.
TRIVIAL MATERIALS SHOULD BE IN CHEAP COLOR, OR B&W.

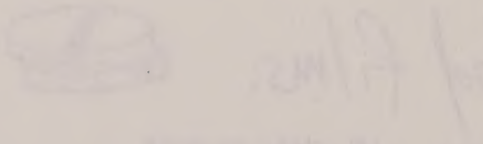
3. Special purpose copies.

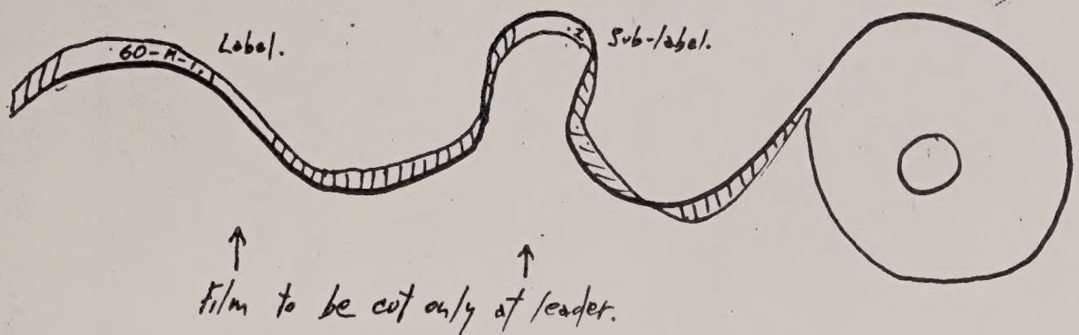
WORK-PRINTS, EDITED FOOTAGE FOR INTRAMURAL PURPOSES, SPECIAL PRINTS FOR LOANING OUT OR SHOWING AT INSTITUTE.

4. Masters of finished films.

ONCE THESE ARE EDITED, WE CAN EXPECT RELEASING ORGANIZATION TO MAKE ITS OWN DUPES; BUT WE SHOULD SAVE THE ORIGINAL, OURSELVES, FOR SAFETY'S SAKE.



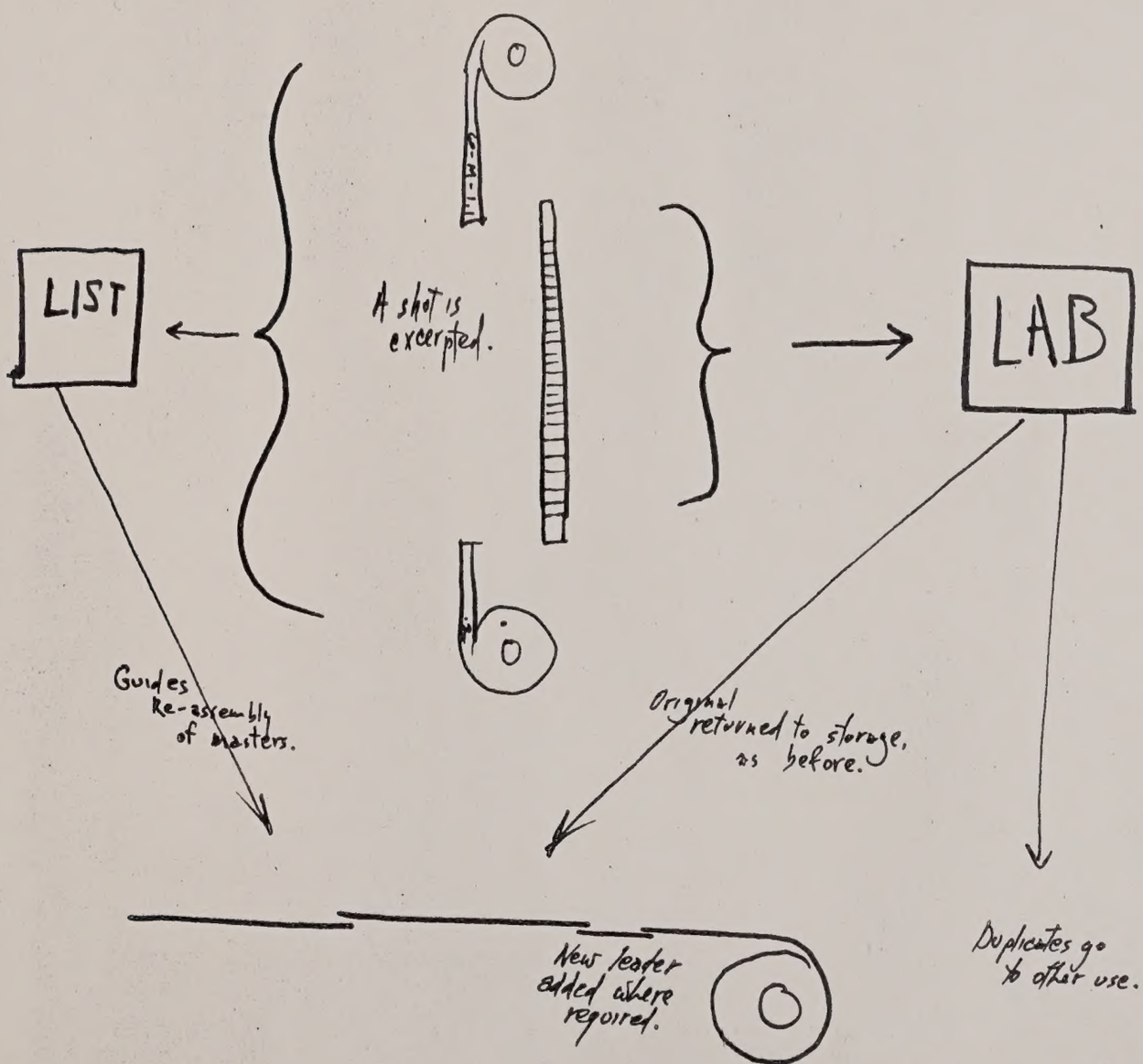


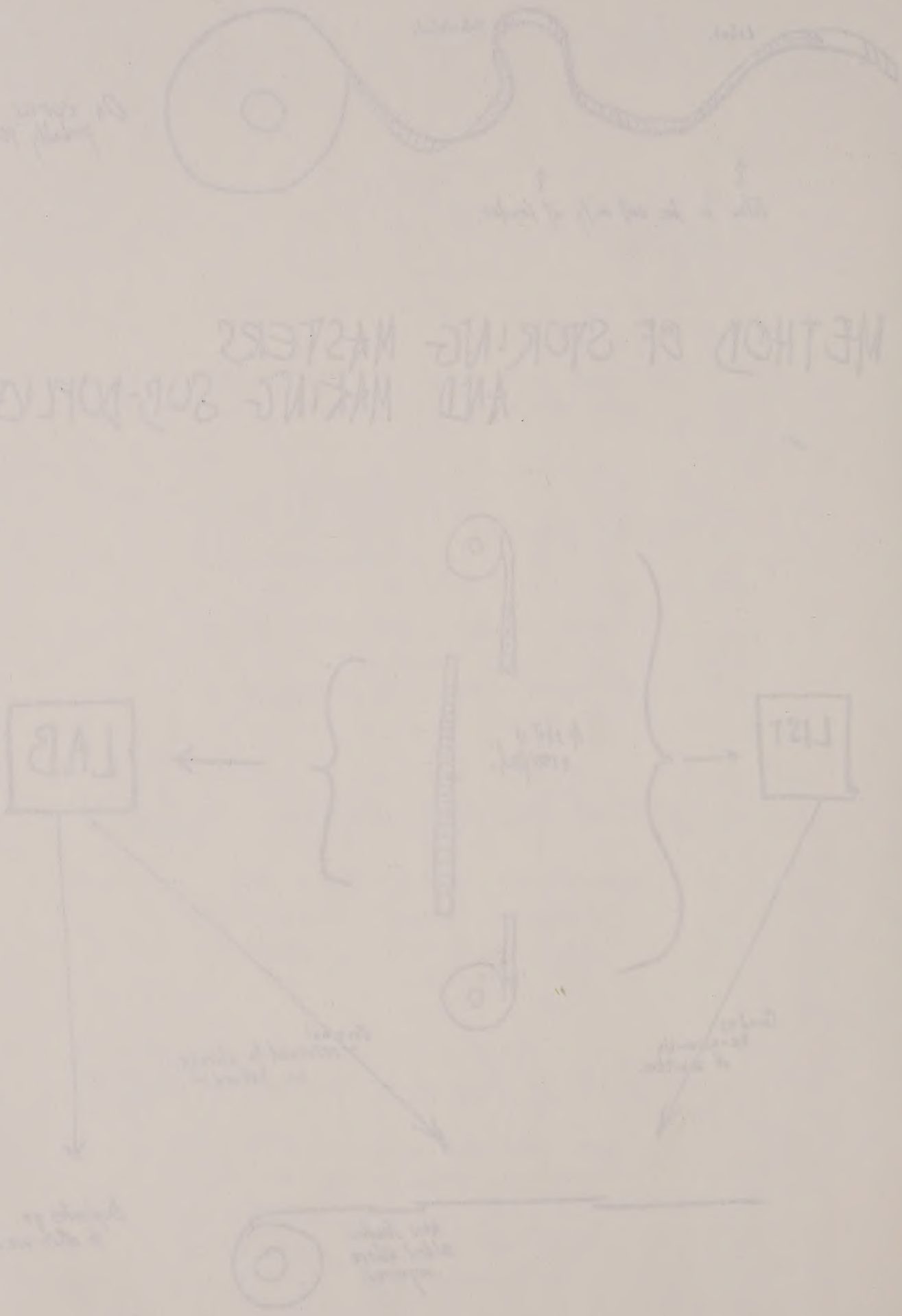


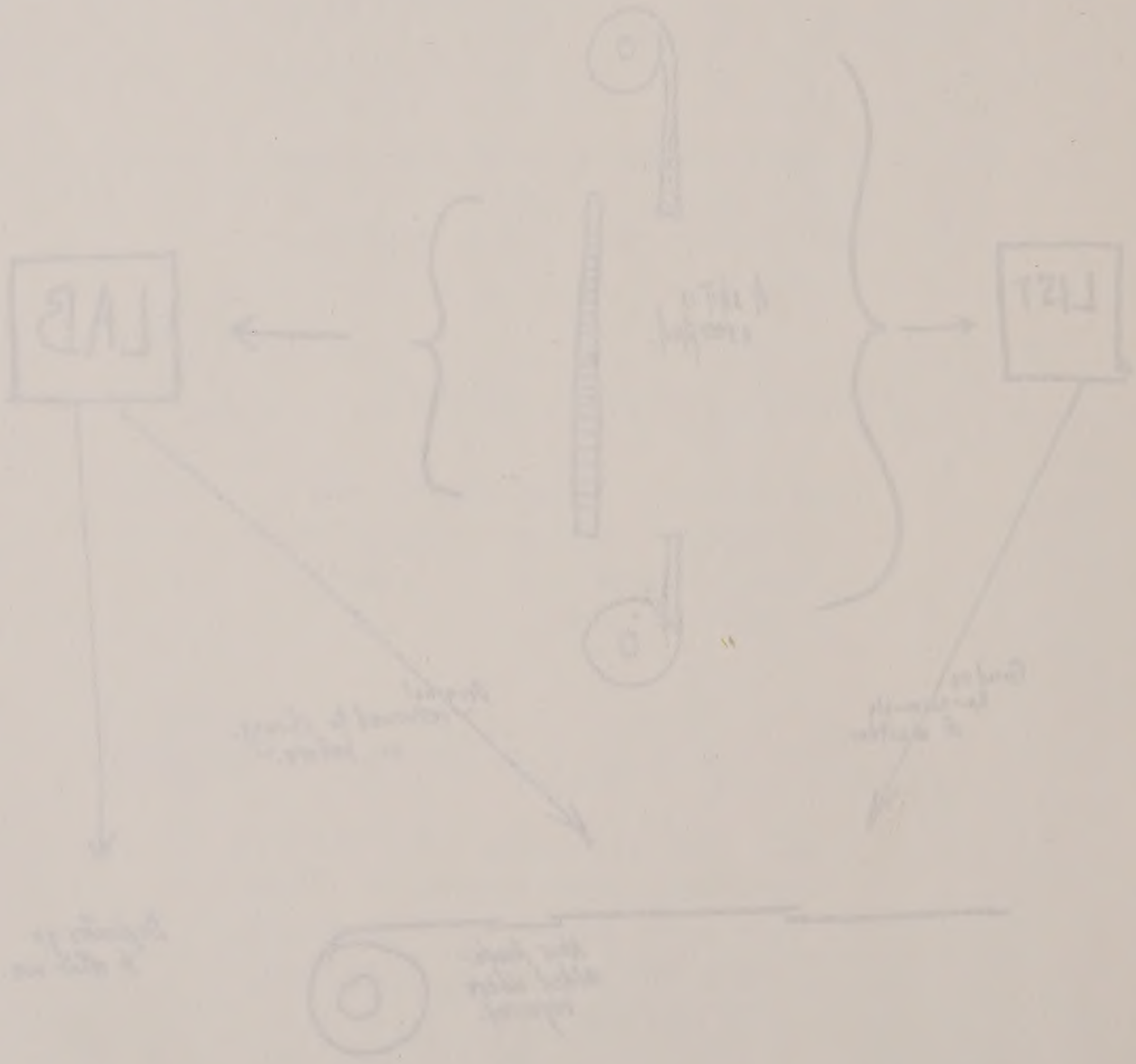
On cores, probably 400 ft. & under.

↑ film to be cut only at leader.

METHOD OF STORING MASTERS AND MAKING SUB-DUPLICATES.






LAB
LAST

Report on File Systems, CR1